

IN THE CLAIMS

Please amend the claims as follows:

- 1 1. (Withdrawn) A method of p-type doping in ZnO comprising:
  - 2 forming an acceptor-doped material having ZnO under reducing conditions,
  - 3 thereby insuring a high donor density; and
  - 4 annealing the specimens of said acceptor-doped material at intermediate
  - 5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate
  - 6 impurity acceptors.
- 1 2. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
- 2 hydrogen containing atmosphere.
- 1 3. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
- 2 non- hydrogen containing atmosphere.
- 1 4. (Withdrawn) The method of claim 1, wherein said acceptor-doped material comprises
- 2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited
- 3 on said n-type ZnO layer.
- 1 5. (Withdrawn) The method of claim 1, wherein said intermediate temperatures
- 2 comprise a temperature range between 200 °C and 700 °C.
- 1 6. (Withdrawn) A method of forming p-n junctions using p-type ZnO comprising:
  - 2 forming an acceptor-doped material having ZnO under reducing conditions,
  - 3 thereby insuring a high donor density; and

4 annealing the specimens of said acceptor-doped material at intermediate  
5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate  
6 impurity acceptors.

1 7. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a  
2 hydrogen containing atmosphere.

1 8. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a  
2 non- hydrogen containing atmosphere.

1 9. (Withdrawn) The method of claim 6, wherein said acceptor-doped material comprises  
2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited  
3 on said n-type ZnO layer.

1 10. (Withdrawn) The method of claim 6, wherein said intermediate temperatures  
2 comprises a temperature range between 200 °C and 700 °C.

1 11. (Currently Amended) A wide band gap semiconductor device comprising:  
2 -a substrate;  
3 a n-type ZnO layer formed on said substrate; and  
4 a p-type ZnO layer formed on said n-type ZnO layer;  
5 wherein said n-type ZnO layer and said p-type ZnO layer are annealed in air to  
6 activate p-type conductivity  
7 ~~an acceptor-doped material having ZnO that is formed under reducing conditions, thereby~~  
8 ~~insuring a high donor density; wherein the specimens of said acceptor-doped material are~~

9 annealed at intermediate temperatures under oxidizing conditions so as to remove  
10 intrinsic donors and activate impurity acceptors.

1 12. (Currently Amended) The wide band gap semiconductor device of claim 11,  
2 wherein said p-type ZnO layer is produced said in reducing conditions comprise  
3 comprising a hydrogen containing atmosphere.

1 13. (Original) The wide band gap semiconductor device of claim 11, wherein said p-  
2 type ZnO layer is produced said in reducing conditions comprise comprising a non-  
3 hydrogen containing atmosphere.

1 14. Canceled.

1 15. (Currently Amended) The wide band gap semiconductor device of claim 11,  
2 wherein said n-type ZnO layer and said p-type ZnO layer are annealed intermediate  
3 temperatures comprise a temperature range between 200 °C and 700 °C.

1 16. (Currently Amended) A p-n junction comprising:

2 a substrate;  
3 a n-type ZnO layer formed on said substrate; and  
4 a p-type ZnO layer formed on said n-type ZnO layer;  
5 wherein said n-type ZnO layer and said p-type ZnO layer are annealed in air to  
6 activate p-type conductivity an acceptor doped material having ZnO that is formed under  
7 reducing conditions, thereby insuring a high donor density; wherein the specimens of said  
8 acceptor doped material are annealed at intermediate temperatures under oxidizing  
9 conditions so as to remove intrinsic donors and activate impurity acceptors.

1 17. (Currently Amended) The p-n junction of claim 16, said p-type ZnO layer is  
2 produced in reducing conditions comprising a hydrogen containing atmosphere wherein  
3 said reducing conditions comprise a hydrogen containing atmosphere.

1 18. (Currently Amended) The p-n junction of claim 16, wherein said p-type ZnO layer is  
2 produced in reducing conditions comprising a non- hydrogen containing atmosphere  
3 wherein said reducing conditions comprise a non- hydrogen containing atmosphere.

1 19. (Original) The p-n junction of claim 16, wherein said acceptor-doped material  
2 comprises a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer  
3 deposited on said n-type ZnO layer.

1 20. (Currently Amended) The p-n junction of claim 16, said n-type ZnO layer and said p-  
2 type ZnO layer are annealed between 200 °C and 700 °C wherein said intermediate  
3 temperatures comprises a temperature range between 200 °C and 700 °C.